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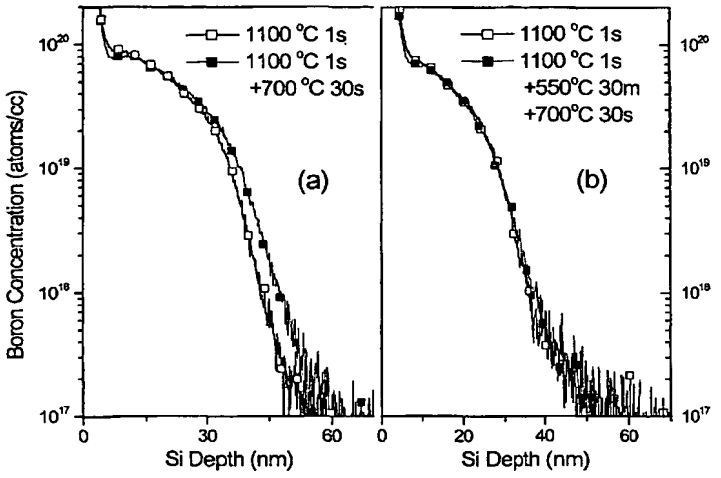
(54) Title: METHOD TO OVERCOME INSTABILITY OF ULTRA-SHALLOW SEMICONDUCTOR JUNCTIONS



(57) Abstract: A method of forming a stable unction on a microelectronic structure on a semiconductor wafer having a silicon surface layer on a substrate includes the following steps: implanting dopant ions into the surface layer; cleaning and oxidizing the surface layer, and twice annealing the wafer to recover a damaged silicon crystal structure of the surface layer resulting from the low energy ion implantation. The first annealing process uses a temperature range of 800°C to 1200°C for a duration from about a fraction of a second to less than about 1000 seconds, with a ramp-up rate of about 50°C/second to about 1000°C/second. The second annealing process uses a temperature range of 400°C to 650°C for a time period of from about 1 second to about 10 hours, and more preferably, from about 60 seconds to about 1 hour. Both annealing processes include cooling processes.

WO 2004/010470 A2